DOCUMENT RESUME

ED 095 381 CE 001 945

| | |
|---|---|
| TITLE | Computer Communications and Operations--Intermediate, Data Processing Technology: 8025.21. |
| INSTITUTION | Dade County Public Schools, Miami, Fla. |
| PUB DATE | Nov 72 |
| NOTE | 23p.; An Authorized Course of Instruction for the Quinmester Program |
| EDRS PRICE | MF-$0.75 HC-$1.50 PLUS POSTAGE |
| DESCRIPTORS | Behavioral Objectives; *Communications; Computers; Computer Science Education; *Course Content; *Curriculum Guides; *Data Processing; Input Output; Junior Colleges; Programers; Secondary Grades; Technical Education |
| IDENTIFIERS | *Quinmester Program |

ABSTRACT

The following course outline is a guide which presents students with the basic programing and operation concepts for developing the skills necessary to become proficient in the area of computer communications and operation. The student must have met the objectives of Introduction to Computer Programming prior to enrollment in this course. The class meets 2 hours a day for 90 clock hours. The outline lists the information the student must learn. It is made up of 11 blocks of instruction (orientation, review of data processing fundamentals, system design, central processor, system units, files, flowcharting, program instruction categories, processing techniques, basic operating principles, and Quinmester posttests) which are broken down into several units each. Listed are the course goals, specific block objectives, a course outline, a 12-item bibliography, and an appendix of Quinmester posttest samples and answer keys. (Author/BP)

VT

BEST COPY AVAILABLE

# AUTHORIZED COURSE OF INSTRUCTION FOR THE QUINMESTER PROGRAM

V-17

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Course Outline
DATA PROCESSING TECHNOLOGY - 8025
(Computer Communications and Operations - Intermediate)
Department 73 - Quin 8025.21

DADE COUNTY PUBLIC SCHOOLS
DIVISION OF INSTRUCTION • 1973

D A D E  C O U N T Y  P U B L I C  S C H O O L S

1 4 5 0  N O R T H E A S T  S E C O N D  A V E N U E

M I A M I,  F L O R I D A  33132

Course Outline

# DATA PROCESSING TECHNOLOGY - 8025
## (Computer Communications and Operations - Intermediate)

Department 73 - Quin 8025.21

county office of

VOCATIONAL AND ADULT EDUCATION

THE SCHOOL BOARD OF DADE COUNTY

Mr. G. Holmes Braddock, Chairman
Mr. William H. Turner, Vice-Chairman
Mrs. Ethel Beckham
Mrs. Crutcher Harrison
Mrs. Phyllis Miller
Mr. Robert Renick
Dr. Ben Sheppard

Dr. E. L. Whigham, Superintendent of Schools
Dade County Public Schools
Miami, Florida 33132

November, 1972

Published by the School Board of Dade County

## Course Description

| 8025 | 73 | 8025.21 | Computer Communications and Operations |
|---|---|---|---|
| State Category Number | County Dept. Number | County Course Number | Course Title |

Basic principles of stored program computers are reviewed. The student then learns how communication with the computer is accomplished and is introduced to the components that comprise a computer system. Through this introduction, the student will learn machine description and basic operating principles of the Central Processor and associated input/output equipment.

Indicators of Success: The student must have met the objectives of Introduction to Computer Programming prior to enrollment in this course.

Clock Hours: 90

## PREFACE

The following course outline is a guide which presents students with the basic programming and operation concepts for developing the skills necessary to become proficient in the area of computer communications and operations. The satisfactory attainment of these skills is intended to prepare the student for further courses in data processing. This elective course is prepared for quinmester use.

The first week of the course provides a short review of stored program computers and the introduction to communication with the computer. The following eight weeks the student will learn how communication with the computer is accomplished, machine description and basic operating principles of the Central Processor and associated input/output equipment.

In presenting the material outlined in this course, the instructor uses lectures, presentations, student participation, demonstration and student projects as methods of instruction. After instruction and practice on the application that has been studied an evaluation of the student's skill and understanding is made.

This is one of a series.

The class meets two hours a day for 90 clock hours. The outline lists the information the student must learn. It is made up of 11 blocks of instruction which are further broken down into several units each.

This outline was developed through the cooperative efforts of the instructional and supervisory personnel, the Quinmester Advisory Committee, and the Vocational Curriculum Materials Service, and has been approved by the Dade County Vocational Curriculum Committee.

TABLE OF CONTENTS
With Suggested Hourly Breakdown


| | Page |
|---|---|
| PREFACE | i |
| GOALS | iv |
| SPECIFIC BLOCK OBJECTIVES | v |
| BIBLIOGRAPHY | 5 |
| **BLOCK** | |
| I. ORIENTATION (2 Hours) | |
| Familiarizing the Student With School Regulations and Course Objectives | 1 |
| Regulations in the use of Equipment and Materials | 1 |
| II. REVIEW OF DATA PROCESSING FUNDAMENTALS (2 Hours) | |
| Principles of Punched Card Accounting | 1 |
| Applications of Punched Card Machines | 1 |
| III. SYSTEM DESIGN (2 Hours) | |
| Basic Components | 1 |
| Basic Functions | 1 |
| IV. CENTRAL PROCESSOR (6 Hours) | |
| Internal Storage | 1 |
| Control | 2 |
| Arithmetic Logic Unit | 2 |
| V. SYSTEM UNITS (10 Hours) | |
| Input | 2 |
| Output | 2 |
| VI. FILES (4 Hours) | |
| Types | 2 |
| Structure | 2 |
| VII. FLOWCHARTING (8 Hours) | |
| System Flowcharting | 2 |
| Program Flowcharting | 2 |
| VIII. PROGRAM INSTRUCTION CATEGORIES (20 Hours) | |
| Input/Output | 3 |
| Control | 3 |
| Arithmetic | 3 |
| Editing | 3 |
| IX. PROCESSING TECHNIQUES (20 Hours) | |
| Program Loops | 3 |
| Subroutine | 3 |
| Memory Flags | 3 |
| Arithmetic Law of Signs | 3 |
| Overlay Concepts | 3 |
| Check Digit Verification | 3 |

X. BASIC OPERATING PRINCIPLES (16 Hours)
Central Processor . . . . . 3
Card Reader . . . . . 4
Card Punch . . . . . 4
Line Printer . . . . . 4
Magnetic Storage Files . . . . . 4

XI. QUINMESTER POST-TEST

APPENDIX - QUINMESTER POST-TEST SAMPLE . . . . . 7

## GOALS

The student must be able to:

1. Demonstrate an understanding of the basic components required in a computer system.

2. Demonstrate an ability to follow proper operating procedures.

3. Demonstrate the ability to apply proper flowcharting procedures in preparing to code programs.

4. Demonstrate an understanding of the instructions and their execution.

5. Demonstrate the ability to follow directions in operating equipment.

6. Demonstrate a basic understanding of the files necessary in a computer processing operation.

7. Demonstrate a knowledge and understanding of terms unique to operating and programming computers.

8. Demonstrate an understanding of the need for proper documentation when preparing programs.

9. Demonstrate the ability to identify the different units in a system.

## SPECIFIC BLOCK OBJECTIVES

### BLOCK I - ORIENTATION

The student must be able to:

1. Explain orally or in writing the desired outcome of the course.
2. Demonstrate, through an oral or written report, an understanding of the care of equipment and materials to be used in this course.
3. Exhibit an understanding of safety practices required in use of equipment.

### BLOCK II - REVIEW OF DATA PROCESSING FUNDAMENTALS

The student must be able to:

1. Explain orally or in writing the principle of punched card processing.
2. Identify, in writing, the various applications of punched card machines.
3. Demonstrate an understanding of coding data by writing an explanation of the principle of coding and how it is applied.

### BLOCK III - SYSTEM DESIGN

The student must be able to:

1. Identify the basic components required in a computer system.
2. Explain orally or in writing the basic functions required to process data.
3. Explain orally or in writing the role of the central processor and its importance.

### BLOCK IV - CENTRAL PROCESSOR

The student must be able to:

1. Demonstrate, by an oral or written report, an understanding of the representation of characters in memory.
2. Explain orally or in writing the use of parity.
3. Identify methods available to access memory.
4. Explain orally or in writing the use of buffers.
5. Demonstrate an understanding of the principle of executing commands, by an oral or written report.
6. Identify the indicators and their use.
7. Explain orally or in writing the Arithmetic Logic Unit function.

### BLOCK V - SYSTEM UNITS

The student must be able to:

1. Identify the unique features of the input units studied.
2. Identify the unique features of the output units studied.
3. Explain orally or in writing the relationship of input/output units to the central processor.

BLOCK VI - FILES

The student must be able to:

1. Explain orally or in writing the two types of files and give an example of their use.
2. Demonstrate by an oral or written report an understanding of the structure of a file using end of record indicators and end of file indicators.

BLOCK VII - FLOWCHARTING

The student must be able to:

1. Exhibit the ability to draw a System Flowchart.
2. Explain orally or in writing the different types of flowcharts.
3. Identify each symbol by name.
4. Follow the logic represented in a function flowchart.
5. Demonstrate, by preparing a written report, an understanding of the role flowcharting plays in processing data.

BLOCK VIII - PROGRAM INSTRUCTION CATEGORIES

The student must be able to:

1. Identify the four categories of program instructions.
2. Interpret the action of each instruction.
3. Write a program that will use at least one input unit and two output units.
4. Explain orally or in writing the instruction format.

BLOCK IX - PROCESSING TECHNIQUES

The student must be able to:

1. Demonstrate through an oral or written report an understanding of the various techniques used in writing a program.
2. Explain orally or in writing the arithmetic law of signs.
3. Identify invalid numbers using check digit verification principles.

BLOCK X - BASIC OPERATING PRINCIPLES

The student must be able to:

1. Explain orally or in writing the function of the Central Processor switches and indicators.
2. Demonstrate by oral or written report an understanding of the use of registers.
3. Identify features unique to the Card Reader.
4. Explain orally or in writing the correct handling of card jams.
5. Explain orally or in writing what will cause not ready conditions.
6. Demonstrate an understanding of the procedures used for file protection by writing an explanation of each procedure studied.

BLOCK XI - QUINMESTER POST-TEST

The student must be able to:

1. Satisfactorily complete the quinmester post-test.

Course Outline

DATA PROCESSING TECHNOLOGY - 8025
(Computer Communications and Operations - Intermediate)

Department 73 - Quin 8025.21

I. ORIENTATION

A. Familiarizing the Student with School Regulations and Course Objectives
   1. School policy rules and facilities of the school
   2. Objectives and requirements of the course
   3. Methods and techniques of presenting instruction

B. Regulations in the use of Equipment and Materials
   1. Safety practice in the use of equipment
   2. Care of equipment and materials
   3. Classroom procedures and cleanliness of work area

II. REVIEW OF DATA PROCESSING FUNDAMENTALS

A. Principles of Punched Card Accounting
   1. The punch card
   2. Coding data
   3. Machine processing

B. Applications of Punched Card Machines
   1. Business
   2. Scientific
   3. Military

III. SYSTEM DESIGN

A. Basic Components
   1. Central processor
   2. Input units
   3. Output units

B. Basic Functions
   1. Input
   2. Output
   3. Storage
   4. Arithmetic
   5. Control

IV. CENTRAL PROCESSOR

A. Internal Storage
   1. Character representation
   2. Parity
   3. Accessing methods

B. Control
   1. Buffering techniques
   2. Command execution
   3. Indicators

C. Arithmetic Logic Unit
   1. Computations
   2. Decisions

V. SYSTEM UNITS

A. Input
   1. Card reader
   2. Paper tape
   3. Magnetic tape
   4. MICR
   5. Optical font
   6. Magnetic disk
   7. Magnetic cards

B. Output
   1. Card punch
   2. Magnetic tape
   3. Paper tape
   4. Line printer
   5. Multiple lister
   6. Magnetic disk
   7. Magnetic cards

VI. FILES

A. Types
   1. Master file
   2. Transaction

B. Structure
   1. Record layout
   2. End of record
   3. End of file

VII. FLOWCHARTING

A. System Flowcharting
   1. System flowchart
   2. Run flowchart
   3. Symbols

B. Program Flowcharting
   1. Function flowchart
   2. Detail flowchart
   3. Symbols

## VIII. PROGRAM INSTRUCTION CATEGORIES

A. Input/Output
   1. Card read
   2. Card punch
   3. Print
   4. Skip
   5. Magnetic file
   6. Paper tape

B. Control
   1. Compare
      a. Alphabetic
      b. Zone
      c. Numeric
   2. Branch
      a. Unconditional
      b. Conditional
   3. Halt
   4. No operation
   5. Address modification

C. Arithmetic
   1. Add
   2. Subtract
   3. Multiply
   4. Divide

D. Editing
   1. Transfer
   2. Mask

## IX. PROCESSING TECHNIQUES

A. Program Loops

B. Subroutine

C. Memory Flags

D. Arithmetic Law of Signs

E. Overlay Concepts

F. Check Digit Verification

## X. BASIC OPERATING PRINCIPLES

A. Central Processor
   1. Switches and indicators
   2. Registers

B. Card Reader
   1. Control panel
      a. Validity check
      b. Not ready
   2. Card jams

C. Card Punch
   1. Control panel
   2. Card jams

D. Line Printer
   1. Control panel
   2. Forms control

E. Magnetic Storage Files
   1. Switches and indicators
   2. File protection

XI. QUINMESTER POST-TEST

BIBLIOGRAPHY
(Computer Communications and Operations)

References:


1. Burroughs B100/B200/B300 Series Component Operations Manual. Detroit: Burroughs Corporation, 1966. n.p.

2. Burroughs B100/B200/B300 Series Electronic Data Processing Systems Reference Manual. Detroit: Burroughs Corporation, 1965. n.p.

3. Claffey, William J. Principles of Data Processing. Belmont, California: Dickenson Publishing Company, Inc., 1968. Pp. 258.

4. Davenport, William P. Modern Data Communication. New York: Hayden Book Company, Inc., 1971. Pp. 208.

5. Introduction to IBM Data Processing Systems. Detroit: International Business Machines Corporation, 1968. Pp. 106.

6. Laurie, Edward J. Computers and Computer Languages. 2nd ed. Cincinnati: South-Western Publishing Company, 1966. Pp. 725.

7. _____. Modern Computer Concepts. Cincinnati: South-Western Publishing Company, 1970. Pp. 926.

8. NCR Introduction to Programming. Dayton: The National Cash Register Company, 1969. Pp. 226.

9. Principles of Business Data Processing. Chicago: Science Research Associates, Inc., 1970. Pp. 309.

10. Randall, Clarence B. and Burgly, Sally Weimer. Systems & Procedures for Business Data Processing. 2nd ed. Cincinnati: South-Western Publishing Company, 1968. Pp. 623.

11. Study Guide For Accurately Defined Systems, A. Dayton: The National Cash Register Company, 1968. Pp. 94.

12. Wanous, Wanous and Wagner. Fundamentals of Data Processing. Cincinnati: South-Western Publishing Company, 1971. Pp. 408.

# APPENDIX

## QUINMESTER POST-TEST SAMPLE

Quinmester Post-Test

Name _____ Date _____ Score _____

Multiple Choice Test Items

Each statement needs a word or phrase to make it correct. Only one of the choices listed is correct. Place the letter of the choice you make in the space provided on the left side of the statement.

___ 1. Which of the following functions will transmit data from the central processor to an output device:

a. Input
b. Arithmetic
c. Control
d. Output
e. Storage

___ 2. Which of the following functions retains data until it is needed by other sections of the system:

a. Input
b. Arithmetic
c. Control
d. Output
e. Storage

___ 3. Which of the following functions directs the flow of data:

a. Storage
b. Input
c. Output
d. Control
e. Arithmetic

___ 4. Which of the following functions transmits data into the system:

a. Storage
b. Input
c. Control
d. Output
e. Arithmetic

___ 5. Which function must take place first in a system:

a. Arithmetic
b. Storage
c. Input
d. Output
e. Control

___ 6. What technique allows a system to maintain rated speeds of every component even though there are differences in the speed of individual components:

a. Address logic
b. Command structure
c. Flowchart logic
d. Buffering
e. Operating

___ 7. How many types of components are required in a basic system:

a. Two
b. Four
c. Five
d. Three
e. Six

___ 8. Which of the following is the heart of a system:

a. Card reader
b. Card punch
c. Magnetic tape
d. Magnetic disk
e. Central processor

## Essay Questions

Read each question carefully. Write your answers neatly and accurately. Your answers should reflect your knowledge of the subject.

1. How does the system flowchart aid the lead programmer?

2. Why is standardization of flowcharting important?

3. What is the difference between a master file and a transaction file?

4. What is parity?

5. How are comparison indicators used by the programmer?

6. List each type of compare instruction and explain the way it is used.

7. When would a programmer want to use an overlay?

8. Explain the use of memory flags.

Listed below are functions to be shown in a flowchart. Read the description of the function carefully. Draw the correct symbol to represent the function to the left in the space provided.

1. Input into this program is in the form of punched cards.

_____

2. This is an exit from this routine.

_____

3. During the update run, when the file has been updated, write it on the magnetic storage.

_____

4. Print the detail information on the line printer.

_____

5. At this point in our routine we must make a decision.

_____

6. We will not terminate this run.

_____

## Matching Test Items

Match each item in Column 1 with the most appropriate related item in Column 2. Place the letter of the matching item in the space provided.

| | | | |
|---|---|---|---|
| ( ) | 1. MICR document | a. | Magnetic tape |
| ( ) | 2. Punched cards | b. | Buffer |
| ( ) | 3. Group mark | c. | Density |
| ( ) | 4. Unsorted transactions | d. | Compiler |
| ( ) | 5. Source program | e. | Sort program |
| ( ) | 6. Master file | f. | Template |
| ( ) | 7. Report | g. | Paper tape reader |
| ( ) | 8. Flowchart | h. | Card reader |
| ( ) | 9. BPI | i. | Father-son technique |
| ( ) | 10. Punched tape | j. | Sorter-reader |
| | | k. | Line printer |

## ANSWER KEY TO QUINMESTER POST-TEST

### Multiple Choice Test Items

1. d
2. e
3. d
4. b
5. c
6. d
7. d
8. e

### Essay questions

1. Gives a clear overall picture as well as providing a means for him to assign necessary programming tasks to others.

2. Enables better communication between the programmer and various people who must work with or are affected by the flowchart.

3. A master file contains pertinent information concerning an item or customer that does not vary as a rule, in addition to, data that reflects the current condition. A transaction file is a collection of records reflecting one or more occurrences that have an effect on the master file.

4. Parity is a system devised to count the number of bits that are on to check for errors in character representation. Parity is used for punched hole character representation in paper tape also.

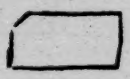
5. Programmers may compare two fields and then check the result of the compare to determine whether a high, low, equal condition exists or after an arithmetic operation, determine whether the result is a positive, negative or zero. Decisions may be based on the condition reflected by the comparison indicators.

6. Alphabetic: Looks at the entire character representation in both fields.
   Zone: Looks only at the zone portion of the character representation in both fields. Ignores the numeric.
   Numeric: Looks only at the numeric portion of the character representation in both fields. Ignores the zone.

7. Overlays may be used when there is not sufficient memory available to accomodate an entire program. One or more segments may be read into memory after the first segments are finished. Each segment constituting an overlay must be self-contained.

8. Memory flags are locations used by the programmer to reflect the situation by storing a code or "setting" the flag. A zero is used to represent a "clear" flag. The programmer has full control over such locations and uses them as needed. More than one condition may be shown by the same flag.

Symbol Questions - Answers may vary

1. 
2.
3.
4.
5.
6.

Matching Test Items

1. j
2. h
3. a
4. e
5. d
6. i
7. k
8. f
9. c
10. g